REMARKS

Claims 1-18 are pending after this amendment.

The remarks presented herein are in response to the Office Action dated October 24, 2006.

Response to Rejection Under 35 USC 102(b) in View of Chang et al.

In the 2nd paragraph of the Office action, Examiner rejects claims 1-15 and 17-18 under 35 USC § 102(b) as allegedly being anticipated by Chang et al. (PCT/US97/08266) ("Chang"). This rejection is traversed.

Based on the following Remarks, Applicants respectfully submit that for at least these reasons claims 1-15 and 17-18 are patentably distinguishable over the cited reference. Therefore, Applicants respectfully request that Examiner reconsider the rejection, and withdraw it.

Claim 1 recites:

> A method of detecting at least one of a pan and a zoom in a video sequence, comprising:
>
> selecting a set of frames from a video sequence;
>
> determining a set of motion vectors for each frame in the set of frames;
>
> identifying at least two largest regions in each frame having motion vectors with substantially similar orientation in a reference coordinate system;
>
> determining percentages of each frame covered by the at least two largest regions;
>
> determining a statistical measure of the motion vector orientations in the reference coordinate system for at least one of the two largest regions; and

comparing the percentages and statistical measure to threshold values to identify at least one of a pan and a zoom in the video sequence

The claimed method is a method of detecting a pan or a zoom in a video sequence. A set of frames are selected from a video sequence and a set of motion vectors are determined for each frame in the set of frames. At least two largest regions in each frame having motion vectors having substantially similar orientation are then identified, and the percentage of each frame covered by the largest regions having similarly oriented motion vectors is determined. A statistical measure of the motion vector orientations for at least one of the identified largest regions is then computed. The computed statistical measure and percentage of each frame covered by the similarly oriented frames are then compared to threshold values to identify a pan or a zoom.

The claimed method thus provides a technique for detecting a pan or a zoom in a video sequence without requiring computation of global motion. Identifying at least two largest regions of a frame with a substantially similar orientation reduces the computation necessary by removing the need to compute all global motion parameters. As pan or zoom detection does not require all global motion parameters, the claimed method reduces the number of motion parameters computed. This parameter reduction creates a computationally efficient technique for detecting a pan or a zoom in a video sequence.

Chang fails to disclose this method. Rather, Chang merely discloses a method for detecting moving objects and scene cuts in a compressed bitstream. There is no hint or suggestion in Chang of detecting a pan or a zoom in a video sequence. Chang specifically states that the disclosed method detects scene cuts and moving objects (see page 13, lines 26-29; page 16, lines 3-20). According to Chang, moving objects can be detected in a video frame using motion vectors or scene cuts can be detected using motion vectors,

but there is no disclosure of using motion vectors to detect at least one of a pan and a zoom. While Chang discloses that a 6 parameter affine transformation can give the global motion of a frame, such a technique does identify at least two largest regions in each frame with substantially similar motion vectors (see page 14, lines 4-8). Accordingly, Chang fails to disclose any method that would provide the particular advantages conferred by the claimed method.

Further, Chang does not disclose "identifying at least two largest regions in each frame having motion vectors with substantially similar orientation in a reference coordinate system," as recited in claim 1. Chang merely discloses detecting moving objects within compressed video information (see page 11, lines 13-15). As disclosed in Chang, moving objects are detected by identifying objects with motion vectors different than the non-moving parts of a frame (see page 17, lines 4-16). Unlike the claimed method, which recites identifying at least two regions with substantially similar orientation, Chang discloses detecting parts of a frame with <u>different</u> orientation. Also, the moving objects detected in Chang are not the "largest regions in each frame," but are merely objects with motion vectors different than non-moving parts of the frame. Thus, Chang does not identify the largest regions in each frame having substantially similar orientation, but detects any objects within a frame that have different motion vectors than other objects in the frame.

Also, Chang does not disclose "comparing the percentages and statistical measure to threshold values to identify at least one of a pan and a zoom in a video sequence." While Chang discloses comparing calculated ratios and coefficient variances to local adaptive thresholds and marking the frame as containing a suspected scene cut accordingly, this comparison is used to identify scene cuts and not to identify pans or zooms. The comparison disclosed in Chang detects regions of a compressed digital bitstream

where one scene is fading out and another is fading in or where one scene has more forward motion vectors than backward motion vectors (see page 14, lines 15-25). Thus, the comparisons in Chang do not identify at least one of a pan and a zoom, or involve information capable of identifying at least one of a pan and a zoom. Unlike the claimed method, which recites comparing percentage and a statistical measure to threshold values to identify at least one of a pan and a zoom, Chang merely discloses comparing ratios and a statistical measure to a threshold value to determine the presence of a scene cut.

Accordingly, claim 1 is submitted to be patentable over Chang.

Claims 7 and 13 similarly recite "identifying at least two largest regions in each frame having motion vectors with substantially similar orientation in a reference coordinate system" and "comparing the percentages and statistical measure to threshold values to identify at least one of a pan and a zoom in the video sequence." Thus, all arguments advance above with respect to claim 1 also apply to claims 7 and 13.

As claims 2-6 are dependent on claim 1, all arguments advanced above with respect to claim 1 are hereby incorporated so as to apply to claims 2-6. As claims 8-12 are dependent on claim 7, all arguments advance above also apply to claims 8-12. As claims 13-15 and 17-18 depend from claim 12, all arguments advanced above also apply to claims 13-15 and 17-18.

Response to Rejection Under 35 USC 103(a) in View of Chang et al.

In the 4th paragraph of the Office Action, Examiner rejects claim 16 under 35 USC § 103(a) as allegedly being unpatentable over Chang et al. (PCT/US97/08266) ("Chang"). This rejection is respectfully traversed.

As claim 16 is dependent on claim 12, all arguments advanced are also applicable to claim 16. In addition, the Official Notice relied upon by the Examiner does not over-

come the deficiencies of Chang. The Official Notice merely indicates that polar coordinates are a form of mathematical representation. The Official Notice does not disclose "identifying at least two largest regions in each frame having motion vectors with substantially similar orientation in a reference coordinate system" and "comparing the percentages and statistical measure to threshold values to identify at least one of a pan and a zoom in the video sequence." Thus, the combination of Chang and Official Notice fails to disclose the subject matter of claim 16.

Therefore, claim 16 is patentably distinct over the cited references, both alone and in combination. Therefore, Applicants respectfully request that Examiner reconsider the rejection and withdraw it

On the basis of the above Remarks, consideration of this application and the early allowance of all claims herein are requested.

Should the Examiner wish to discuss the above amendments and remarks, or if the Examiner believes that for any reason direct contact with Applicants' representative would help to advance the prosecution of this case to finality, the Examiner is invited to telephone the undersigned at the number given below.

Respectfully submitted,
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